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ABSTRACT

This paper relates contemporary information about communications and media technology to the task of reconstructing educational institutions. This paper treats three broad areas: a) learning centers which will satisfy individual needs, b) fundamental principles supporting the centers, and c) the implementation of the learning centers. The first portion explains five learning centers which are labelled according to purpose: idiosyncratic, social ecology, performing arts, academic, or skills. The principles supporting the need for learning centers include the following: 1) New models of learning are required to provide strategies for collective action and personal developments. 2) New ways of educaton must be developed to support the new possibilities of communications technology. 3) The present educational system was constructed for a status-oriented, slowly changing society. 4) There is a need to increase commonalty and diversity simultaneously. 5) The present classroom setting and teacher role are obsolete. Finally, the principles of this new educational theory and the means to implement these concepts are discussed in relation to achieving the final goal of reconstructed educational institutions. (MJM)

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The Magic Lantern:

Metaphor for Humanistic Education

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> "A century devoted to the rationale of technique was also a century so irrational as to open in every mind the real possibility of global destruction. It was the first century in history which presented to sane and sober minds the fair chance that the century might not reach the end of its span. It was a world half convinced of the future death of our species, yet half aroused by the apocalyptic notion that an exceptional future still lay before us. So it was a century which moved with the most magnificent display of power into directions it could not comprehend. The itch was to accelerate--the metaphysical direction unknown."[1]

The complexity of our present social situation has outdistanced our adaptive capacity to the point where the world is in danger and personal chaos threatens most of us. Strangely, we now possess the capability to redesign education (and many other institutions) so that they become a major force for personal fulfillment, common enterprise, and the humanizing of society.

Our task is to identify the dynamics of our difficulty and to present propositions on which we can redesign the system.

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Specifically, my charge is to relate contemporary information about communications and media technology to the task of reconstructing the institutions devoted to education. My relative ignorance of communication research prevents the possibility of dealing with questions about the substance of communication which should be taught or the strategies which might be used to teach communication skills. This limitation is fortunate, for the domain which remains is enormous. To limit it further, I will focus specifically on the problem of adjusting education to the contemporary media ecology -- both to enable people to cope with the current social world and to use the developments in electronic media to increase personal development, social fulfillment, and the rejuvenation of society.

The Institution is the Message

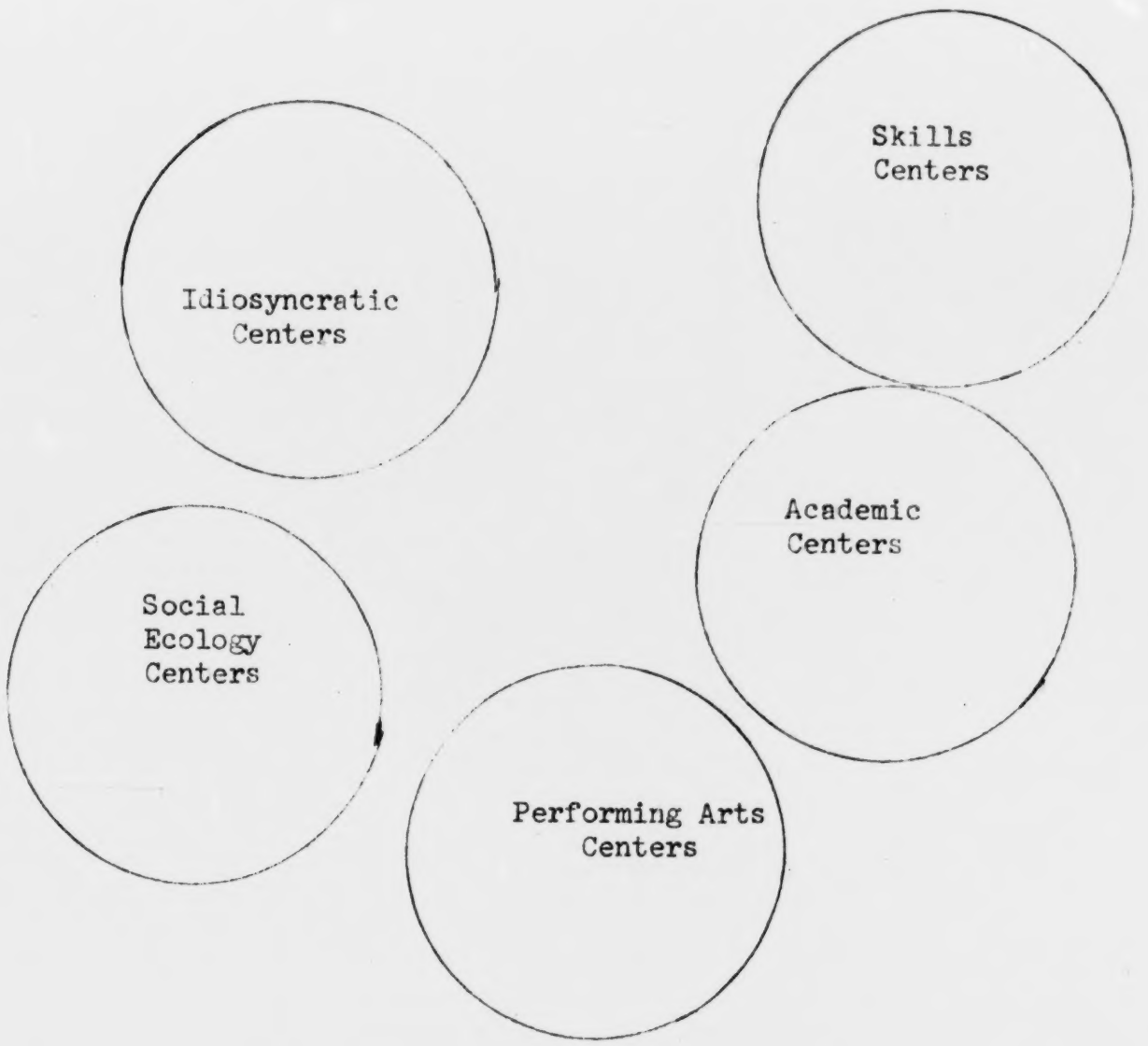
To sharpen the issues let us begin with a visit to a mythical school of the future. The design of this school communicates the primary message of the paper, just as the chief impact of any institution is from its form -- an influence more powerful than from the specific activities and substantive communications which are engaged in within that form.

Our school is not housed within a single building.[2] It is organized as a series of learning centers which occupy a variety of physical locations. To visit it we must move from one center to another, although we find that some technical support systems are common to them. In fact, a general storage and retrieval system is designed so that students can retrieve information in several media and also instructional systems from their homes as well as from the learning centers.

The learning centers are designed to serve several purposes, as indicated by the names in Figure One.

Figure One

Learning Centers by Purpose



Idiosyncratic Centers

These serve the students on their own terms. They are staffed with counselors and facilitators who relate to students as equals, helping them formulate their goals and procedures. The Facilitator-teachers help the students relate to a wide variety of part-time teachers -- members of the community who serve, largely on a voluntary basis, as tutors, resources, advisors, and teachers of short courses.[3] In addition, they help students relate to the other centers where other teachers and tutors can serve them. The center for the performing arts, for example, serves individuals who wish to relate to activities in that center, as does the Social Ecology Center and the Academic Study Centers.

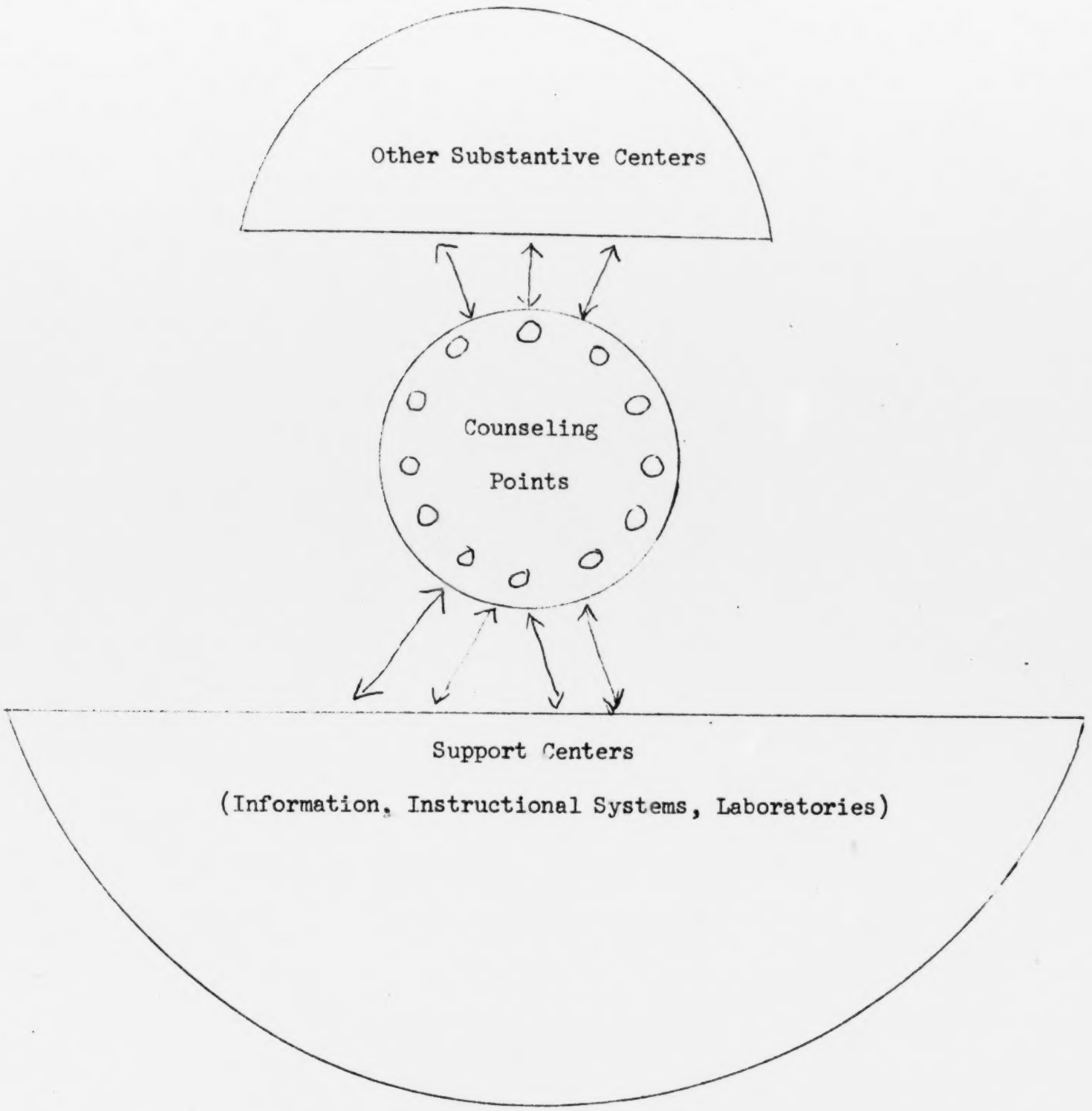
The Idiosyncratic Centers are also supported by a multimedia "library"[4] and data bank, most of which is automated and which employs microfiche and microfiche copymaking units to bring access to virtually all the material available in the Library of Congress. Many of the automated storage facilities are shared by all the "schools" of the region. The library supports all activities of the other centers.

The center is also supported by the instructional Systems Bank, which consists of an array of self-administering multi-media instructional systems in the most common areas. A modular plan permits students to select among the offerings and assemble sequences of them to serve specific purposes.

Thus, the Idiosyncratic Centers consist of counseling areas, where students (of all ages) make contact with counselors-facilitators who help them define their own goals and procedures and relate to the support services they need to actualize their plans.

Figure Two

Organization of Idiosyncratic Center



The services of the Idiosyncratic Center are available to students from their early childhood until senescence. A student can use the counseling services to obtain personal counseling, diagnosis of needs, facilitation of career education, to follow hobbies, or to obtain advanced training in academic areas of performing arts. In the early years the Idiosyncratic Center provides twenty-five to thirty per cent of the entire schooling experience whereas by middle age most schooling is obtained through it.

The Human Ecology Centers

Whereas the Idiosyncratic Center is designed to facilitate personal growth and to enhance individuality, the Human Ecology Center is devoted to the process of improving the society. It is organized to facilitate problem-solving groups who study social issues and problems, examine and improve their own interpersonal behavior, and generate social action to alleviate social problems and initiate improvements in societal relations.

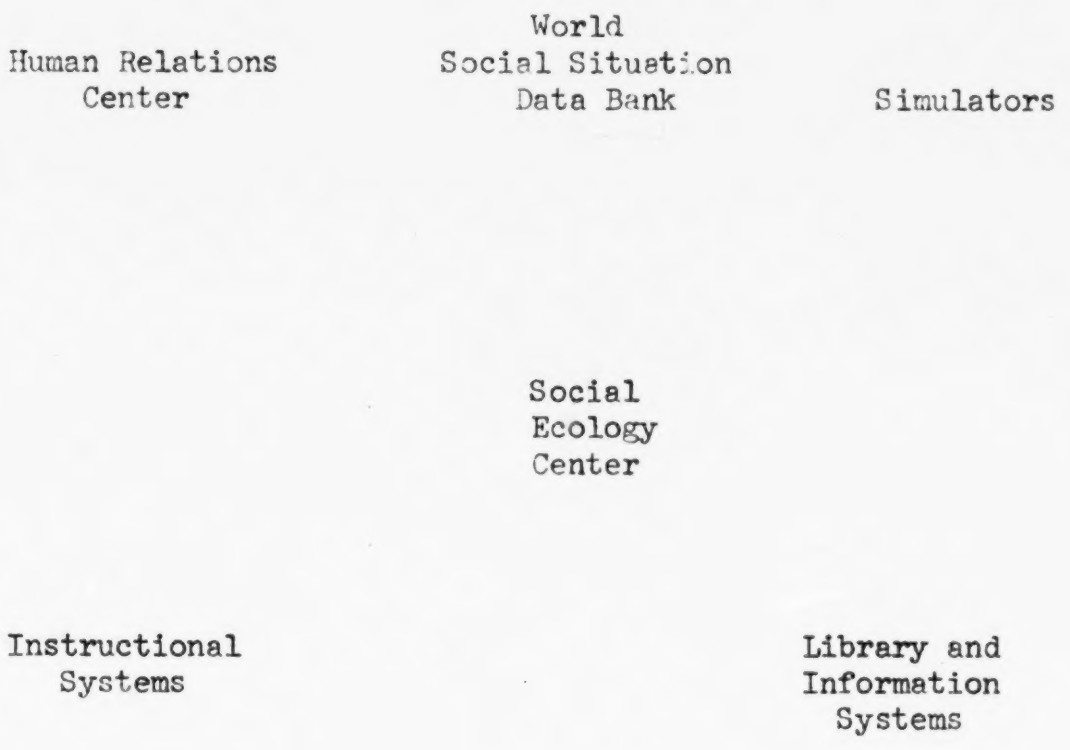
The library, data bank,[5] instructional systems centers and the Academic Center provide support, but the Human Ecology Center employs a series of simulators and an information retrieval system based on the Social Situation of Planet Earth as essential supports. An urban simulator supports the study of community problems, an inter-nation simulator provides service to the study of international problems, and an Earth Resources simulator is used to study biological support systems.[6]

The teachers in the Human Ecology Centers are group leaders, for the most part, skilled in human relations training and the use of teaching models which facilitate dialogue on social problems and the organization of social problems.[7]

Students relate to the Human Ecology Center from the earliest years, but at first they concentrate only on neighborhood problems and face-to-face human relations. Gradually they increase their scope, studying ecology, urbanization, government, and the creation of an international community. The simulators enable them to study social process and try on alternative modes of social behavior. Human relations exercise helps them to explore ways of reaching out to one another and organize themselves to improve social life in day-to-day relations and in the generation of action to improve societal patterns.

Figure Three

The Social Ecology Center



The Skills Center

In the Skills Center students relate to diagnosticians who assess their communications skills and basic areas of knowledge, helping them to relate to instructional systems and to tutors.

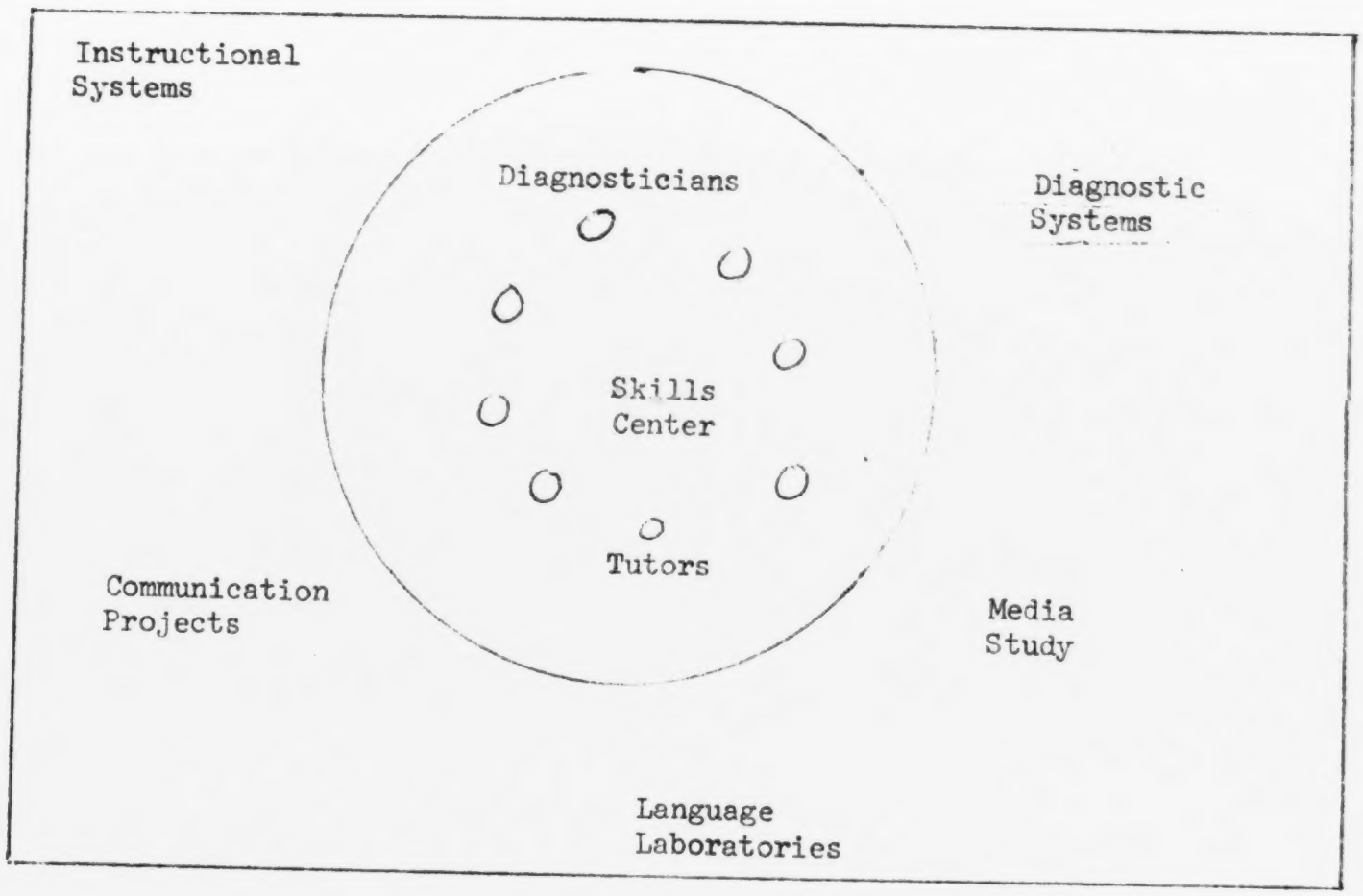
While the younger child spends considerable time in the Skills Center or pursuing related activities, persons of all ages relate to the center, improving their skills and learning new ones.

Communications skills in all media are included in the center. For example, making and comprehending film is as prominent in the center as is writing and reading. Seminars on form and substance are correlated with the study of encoding and decoding skills so that the structure of media and symbol systems and the processes of encoding and decoding messates are made. At the advanced levels, the studies would include training in the comparative analysis of media and symbol systems and the creation of communication units in alternative modes.[8]

The Skills Center would also include training in the use of the support systems which facilitate each of the learning systems. Training in the use of multimedia instructional systems, information storage and retrieval systems, and diagnostic and management systems are embedded in the center. The Skills Center includes technical training in self-education which complements the counseling in the Idiosyncratic Center.

Figure Four

The Skills Center



Academic Centers

In the Academic Learning Centers (in the humanities, aesthetics, empirical studies, mathematics) students join groups of other students for three types of courses. One is survey courses in specific areas, conducted by teachers with support from the Instructional Systems Center. These are followed by inquiry courses in which students work with academic teachers to try on the modes of inquiry of the disciplines. Advanced students relate to academic tutors who help them construct plans of personal study and to relate to groups

of similarly advanced students. These centers are housed in laboratories which are especially constructed for the discipline (as physics laboratories, art workshops, etc.) and are supported by the Library and Instructional Systems Centers in the same way as the other centers.

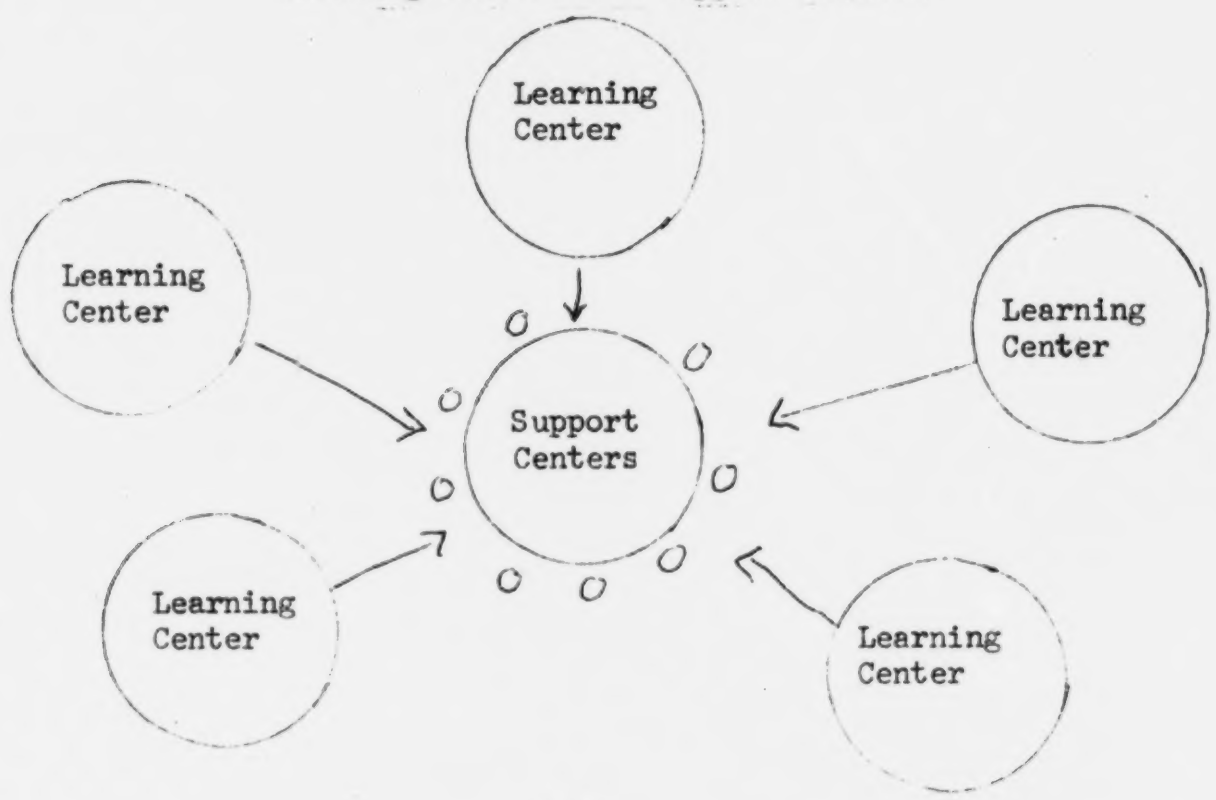
The Performing Arts Center

Music, drama, televison and film production, dance, athletics, and the other performing arts are housed in a network of laboratories, workshops, and little theaters throughout the community. Students relate to the Performing Arts Centers in a variety of relationships, some for an initial survey experience, others for recreation, some for skill development, and others as a long-term, expressive venture.

The school contains other learning centers, but the number described thus far is probably sufficient to provide a concrete idea of the concept on which it is developed.

Figure Five

Learning Centers and Support Centers



The essence of such a school is the acquisition of a variety of models of learning[9] strategies which the student would use to educate himself.

The student, in such a school would create his education from the array of learning opportunities which are offered. "Nurturant" teams of counselor-teachers would help the younger children do this, and would provide a stable environment for them in "home base" locations. The older students would turn to their Idiosyncratic Center counselor for assistance. Adults would operate on their own unless they wished to consult their Idiosyncratic Center counselor.

Thesis

That such a school should exist is the thesis of this paper. Why it should, and how we can create it, is argued in a series of propositions.

Why Should We Change the School?

Four reasons are argued as propositions.

The contemporary media ecology--our social world--is vastly out of synchronization with the present school.

If the new media are applied to the old modes of education, a Huxleyian world will result (an industrial mode made monstrous by technetronic exaggeration).

The present school is fitted for a hierarchical, industrial society not for the post industrial technetronic order.

The old education was designed to homogenize men and to set them competitively against each other for common goals. We need diversity and cooperation instead.

The form of the school was actually created for preparing children for pre-industrial village life. Like the village, it repels innovation and personalization and must be replaced by a fluid, powerful form for life-long education.

We will examine these propositions in turn and then consider concepts for rebuilding education.

Proposition One. The technetronic revolution has created a new social world which outdistances the response modes taught in present schools. New models of learning are required to provide strategies for collective action and personal development.[10]

McCluhan's "The Medium is the Message" captures the essential effect of media technology on social life. "What we are considering here. . . . (is) all the psychic and social consequences of the designs or patterns as they amplify or accelerate existing processes. For the 'message' of any medium or technology is the change of scale or pace or pattern that it introduces into human affairs."[11]

What he has termed the "global village" has become our normal habitat. The nature of this world has been created by changes in our media technologies and the process of media change is circular. As media transmit messages, they transform social life. In turn, this transformation is content for transmission by yet other transforming media. (Thus information about airplanes is procured and transmitted by radar, retransmitted by radio, processed by computer, and interpreted through systems analysis. Humans enter this process constantly and contribute degrees of clarity and distortion. The scale, pace, and pattern of social relations have changed--changing the content of life.)

The messages of form and those of substance are both information, but the media constitute not only information but make up also the environment in which we relate to all other aspects of our world. Ivin's remarkable study Prints and Visual Communication is built around this theme: "For centuries the European world had been unable to distinguish between factual reporting, with its necessary requirement of verisimilitude (of which perspective was an essential part), and that expression of values, of personality, and of attitudes toward life, with which verisimilitude is always at war....At last, thanks to the photograph, visual dream and expression were no longer required to conform to the informational reportorial demands of the ordinary businesses of life."[12]

Ivin sees the photograph as the culmination of a long line of attempts to report reality. "Although it has very great limitations, it has no linear syntax of its own and thus has enabled men to discover that many things of the greatest interest and importance have been distorted, obscured, and even hidden, by verbal and pictorial, i.e. symbolic syntaxes that were too habitual to be recognized. It is unfortunate that most of the world is still unaware of this fact.

"In a way, my whole argument about the role of the exactly repeatable pictorial statement and its syntaxes resolved itself into what, once stated, is the truism that at any given moment the accepted report of an event is of greater importance than the event, for what we think about and act upon is the symbolic report and not the concrete event itself."[13]

The implications of this situation are barely explored at this present writing. Only two hundred years ago the events that triggered wars were reported by a few eyewitnesses to heads of state who in turn reported these and interpreted them to the people. The medium that was accepted was one

of symbolic transmission by a very few people whose verisimilitude could not be judged. At present, television cameras and motion picture cameras move onto the scene of events and the resulting images are transmitted to the bulk of the people in terms of the significant events as these are perceived by cameramen, producers, and editors. The mediatechnology world is different both in the substantive message which is received from the more linear media but in the social situation which has evolved.

What McCluhan, Mailer, and Ivin are emphasizing is the importance of learning to live with a particular world of information transmission. Whereas when our present educational system was created we were very much separated from one another in that very few of us could contact the individuals who had been the eyewitnesses to events. Thus, if someone wanted to claim that a political leader had been killed at Sarajevo by a person of a particular nationality, we were in no position to argue inasmuch as we were far separated from the individuals who wished to believe that or who had information that that was true. If the Hearst papers wished to claim that the Spanish had blown up the battleship, Maine, who was to argue? In addition, we were accustomed to living in a world characterized by fragmented forms of communication. We know that very few of us could have images of an event except through print or oral communications transmitted through many intermediaries.

At present, however, we live with documentation of a different order. We were all present, in one sense or another, when Lee Oswald killed John Kennedy and when Jack Ruby in his turn killed Lee Oswald. In the case of Ruby, we were able to observe the television images of him firing the gun and saw the impact of the bullet on Oswald's body. We experienced the direct shock of that impact, and we have grown accustomed to living where we could perceive

events from media which minimally distort the reality which is being reported and which give us a sense of participation.

At the same time, the very verisimilitude of pictorial images and recorded sound has caused us to become acutely aware of the function of the hands which hold the camera and the microphones and which, more important, edit the products thereof. The Democratic National Convention of 1968 has driven that point unforgetably into the American consciousness. Question of bias in reporting from Chicago's Mayor Daley the news teams of the major networks, the various staffs of the candidates, and the participants in the streets have left the nation struggling with a legacy of alternative views of the same events. The outcome of the national election may well have been determined by the ferment attending the convention, a ferment which in all senses was "mediated" not only in that events were mediated to us and shared by us but in the sense of our awareness of living in a common world as if suspended like colloids in a solution of media. This is the message of the film, Medium Cool, whose very title is an ironic metaphor taken from McLuhan's slogan about the properties of television.)

The problem is not that contemporary media require intellectual skills which were not developed formerly--I see little evidence that the "decoding" processes are fundamentally different. What has happened is that participation in social life requires substantially different modes of behavior than were adequate in small isolated communities dominated by print and oral communication and relatively primitive graphics.

Current educational systems simply are not teaching people how to live in mass, electronically--connected societies.

Proposition Two. Due both to social changes and to the new possibilities which communications technology have created, we cannot improve education simply by applying new knowledge and technology to the old educational modes but must instead create new ways of educating and support them with our new technology.

Why can we not relate our advances in media and other technologies to the future of education simply by thinking of their application to traditional educational purposes and methods? Certainly the application of film, television, computer, and new types of print to the traditional teaching tasks of schooling is an important enterprise and one which is sorely underdeveloped. However, with other developments, they have created for us a new world which has to be lived in and comprehended. While creating frightening complexities and prospects, they have given us power that we did not have when the traditional education was conceived. Media technology and other forces have brought about a new world which requires a new education if we are to create the likelihood that the century will reach its span and, as the other side of that coin, realize the extraordinary power we have been given.

McCluhan neatly underlines the problem of responding to new possibilities, "When radar was new, it was found necessary to eliminate the balloon system for city protection that had preceded radar. The balloons got in the way of the electric feedback of the new radar information."[14] The analogy may apply to much of our school curriculum, educational modes, and even the entire way we organize ourselves for education. We can afford to use only those portions of present education that enhance the perception of our technologies and their psychic and social consequences and give us necessary control over our personal and social destinies. This is why the importance of media to education

is not because it enables us to do the old things more efficiently. The essence of the implications of the media changes for education is that the media have created a different world in which we are presently unable to live effectively and this world requires a new education both in order that we may be able to survive in it and that we may be able to capitalize on its potentiality in order to increase our own possibilities as human beings and take charge of our common destiny. If we do not make fundamental changes in education, we will drift with the winds of technology and obsolete social organizations and probably create a world almost exactly like the one that Huxley envisioned in Brave New World. One in which the human dysfunctions of the educational system are magnified and made crushing by the addition of more powerful technology. In fact, the Huxleyian technical tyranny would probably be preferable to the second most likely alternative if we do not gain control over our new world--a terminal experience in machine-mediated violence.

In the case of technology the essence of moral activity is not simply in what we choose to do but in the development of restraint as well. When man invented the hatchet, he could will to use it to provide food and work and shelter or to make war with it. The hatchet was inefficient enough that warlike man could not exterminate his species with it. The Intercontinental Ballistic Missile System is not so impotent. The determination not to let technology run riot is as critical as learning how to rejuvenate ourselves through it.

This problem is so pervasive as to affect all areas of life. For example, as governments learned to manage citizens, some leaders created petty tyrannies, but until recently communications did not permit very many of them to control

very many aspects of life. Now, however, systems management procedures provide governors with enormous and pervasive planning and monitoring capability power which in fact must be exercised because of the complexity of world problems. In many cases, also technologies must be controlled by political process or be controlled and exercised by technologists who become the true governors. Presently the power of the advertising and entertainment industry to shape minds through media is beginning to control the electoral process when their technology is turned toward it.

Restraint, then becomes essential. If man is to control his destiny, he must achieve the power to control his mediated world. In the domain of education we can control media so that learning technology increases the freedom, competence, and aesthetic richness in life, or we can allow it to be used to reduce freedom, pander to the petty capacities, and deaden aesthetic pleasure by casually letting learning technologists spread a deadly mode of education simply because it is available and efficient.

The early history of educational media technology was dominated by considerations about the specific usefulness of various media to present reality to students. As Saettler[15] points out in his exhaustive history of technology, the exhortatory literature was dominated by the assumption that verbal instruction left much to be desired because it is so far removed from reality whereas the visual media are superior because they are closer representatives of reality and should replace or supplement print or the spoken word because of the quality of verisimilitude. This questionable assumption was understandable when the chief purpose of the educational technologist was simply to increase the efficiency of the teacher. With that purpose the character of media as transmitters of messages about reality could be the dominant focus of concern, and it was not unreasonable

to try to diversify the media which were being used in the classroom so that the dominant media--the teacher's voice and textbooks written by hacks might be augmented or replaced.

That old concern, to help teachers diversify their approaches, is no longer the most pressing issue. Rather than beginning with the classroom and seeking to improve learning within its confines, we need to design centers for learning and determine ways of making them available to students in accord with humanistic missions.

Proposition Three. The present educational system was constructed for a status-oriented, slowly-changing society, in which consumption of the world's resources was expanding and the needs of industry dictated the content and structure of the educational system.

The technetronic society changes rapidly, requires constantly-negotiated status, is conservation-minded and post-industrial (service-minded) in organization. It requires an education to match.

The Industrial Order and the Structure of the Educational System

The basic forms of the present-day educational system and the most practiced educational methods evolved slowly throughout the nineteenth and first half of the twentieth century when the modern industrial state was being developed. Nearly all of the characteristics of education-in-practice were derived from the needs of an industrial society and the desire to provide citizens with the opportunity to make their way within the industrial hierarchy and the social status system which reflected it.

For example, the content of education (reading, writing, and arithmetic as the basic skills and chief content of elementary education; higher mathematics, government, literature, and languages in secondary education; vocational and technical preparation in the junior colleges; and academic scholarship and professional study in the senior colleges and universities) were all designed to provide entrance to the economic world and to help people establish and maintain families in that world. Nearly all of the educational reform movements which ran counter to that direction have not been successful. The child-centered education movements, (1) movements to create citizens who would develop a new kind of democracy, (2) and even academic reform movements (3) were not incorporated into the central flow of education unless they fit the requirements for mobility within an economic community. The arts and literature have never achieved a central place in the educational scheme for this reason (If, for example, a young man were to become too interested in the arts, he became somewhat dis-functional economically, and it was not in the interest of the community especially his family and that of his girl to encourage this.). Such important areas as human relations training have not been incorporated in the schools because they have such an indirect effect on economic success.

Many of the liberal reform movements of the last twenty years have tried to extend the possibilities for inclusion in the economic society rather than to change the direction of education. Equal opportunity for education has obviously been denied to blacks and to other minority groups and in response compensatory education procedures, the integration of school systems, the great expansion of community colleges and higher education, and the reduction of race and class-related barriers to admission have all been attempts to bring to more people the possibility of economic advancement.

In addition, the graded form of education fits the need for industrial classification nicely. One's economic future is determined by where he gets off the educational ladder. This has perpetuated and reified the inequities within the system. The economic advantages conferred by categories of accomplishment has had little to do with the direct vocational utility of education. Very few people would pretend that the liberal education at a private liberal arts college was direct preparation for middle management in industry, but for many years, industrial recruiters combed the liberal arts colleges because they screened out persons of fairly high potential, provided them with general knowledge, and socialized them to advancement within the industrial world.

The methods of education--largely drill and lecture--have been tuned also to industrial society, for they resulted in regimentation and socialized children to a competitive, "work-for-the-goals" view of life, one well-suited to the present economic order. All this will soon pass--for the world has changed.

The simple fact is that education for mobility through the system has become a false hope for most people. We are presently producing far more educated people than can be absorbed in the industrial commercial system at the kinds of levels which persons of that amount of education have come to expect. Many of our professions, even the social professions, such as law, engineering, education, and social work, have become vastly overcrowded with qualified people. In addition to this, it is plain that we cannot continue to expand the industrial system indefinitely without destroying our ecology, both the social ecology and the biological ecology, which are, however, not unrelated systems. Previously, as we expanded educational opportunity, there was hope that industrial and commercial enterprises would continue to expand and provide further opportunities so that there would be more jobs and more modes of living than before.

The fact is that technetronics has greatly reduced many of the traditional types of jobs and will continue to do so. It is also clear that simply expanding the consumption of our plant, and providing more consumer goods, cannot go on indefinitely if we are not to destroy our biological ecology. Urban industrial sprawl has been equally destructive to social life and the increasing standardizations of products and culture and the awareness of that standardization which is brought to us through media has exacerbated the problem.[16]

Equally, the possibility of a terminal economic education has disappeared almost entirely. There plainly are not going to be simple career lines which do not require a constant re-education and even an entire reshifting of careers. In a world in which technetronics brings about constant change, the traditional preparation for a traditional profession which one could expect to remain stable throughout his lifetime with only small increments or changes has changed almost entirely. The world is changing so fast that constant readjustment is necessary.

Similarly, social life has changed remarkably. We are linked to each other through electronics in myriad ways, and the events in one part of the world greatly affect the other both through industrial linkages and through communication. Forty years ago we could talk about education for one world as a kind of socialization of people to a warmer way about feeling about strangers. At present it is a vital necessity that the educational system teach us how to live in the global village, that we learn to make that global village a kind of world which we really want to live in and can live with each other in.

It is not only our international life and technical-industrial life that is changing. Urban sprawl has changed family life enormously.

Commuting, being shunted from job to job, moving from house to house, our children moving from school to school, living in constant demands for readjustment have taken us from the simple village life within an extended family or the quiet settled life in a long-term neighborhood and plunged us into a social maelstrom within which we feel helpless and which interacts with anomie to make us feel alienated from ourselves and from each other. In my childhood visiting my grandparents and my grandparents' friends, I sat on Victorian sofas and chairs which they had bought at the time of their wedding in the parlor of the house which they had bought at that time also or shortly after. When they died and we went through their possessions, we found that those were the accumulations of a lifetime. They had, we discovered, essentially lived in one style for their entire span. That style of life is so rare as to have become an anachronism today, but its passing is not unlamented. One of the great sources of bitterness on the part of white blue collar workers who have moved from urban neighborhoods to escape integration with blacks is that they feel that the solidity of their old neighborhoods which they knew as children have been torn up and destroyed in the change of the northern cities. Without condoning their racism, we can only sympathize with the problem they face as the community matrix of their social life is torn up and even destroyed. We have to create entirely new modes of developing families and family relationships, communities, and community relationships, nations and relationships within nations, and a mode of international citizenship which can enable us to survive and reach far beyond survival to a richer existence. Each of these levels of relationships are incredibly complex in the technetronic world.

The complexity is magnified at the most personal level--in family life. For many of us the support of our extended family is gone. We try to raise our children and cope with one another's frustrations by ourselves.

A husband and wife feel isolated against the world, and when they have difficulties in their relationships, these difficulties seem monumental because they threaten the only source of social stability that either party knows. The problems of marriage are enormously intensified by the outlandish importance of the conjugal relationship in the life of both parties. Small discontents, peccadilloes which in the matrix of an extended family would be laughed out and coped with by the social group become magnified out of all proportion because they represent defects in the only seemingly stable relationship in the lives of the couple. Thus the family unit, once so desirable, seems much less desirable to many young people, and the having of children which seemed such an incredible joy only a few years ago now seems fraught with danger and has become a distinct economic liability in an uncertain world.

The old education, created for a simple, stable world of primitive media, focused on simple lines of social life within the extended family and simple career lines within a slowly changing economic world, has disappeared as a useful force. To continue to educate children for the past world is a travesty of educational morality.

We cannot find long-run solutions to educational problems primarily by applying technetronic educational devices to the old forms of education because the more powerful media would only compound the problems created by the mismatch between social need and present education. At present we have an outmoded education. If we use contemporary technetronic devices to increase the power of that obsolete education, we increase the obsolescence of the system rather than modernizing it. Huxley tried to tell us this very clearly in Brave New World, when he combined an old-style social order with

an old-style education made enormously more powerful through the use of contemporary technetronics. The Huxleyian world will surely result if we assume that present educational forms will be made adequate simply by increasing their power and efficiency.

Proposition Four. Industrial-age education was created to homogenize men. Our challenge is, rather, to increase commonalty and diversity simultaneously.

The existing educational system was designed to standardize persons by teaching them the same thing. The "educated" man was one who shared a common body of knowledge with other men. Just as standardization in commerce has decreased product differentiation, so has the spread of the educational system increased the threat to human diversity. The reactions of blacks, American Indians, and Mexican-Americans within the United States to an education which neglected their cultural heritage reflects the discontent with and fear of the standardizing power of the educational system. In the early part of the twentieth century, the educational system deliberately ignored the ethnic differences of the immigrants to the United States in an effort to create a melting pot and to form a new standard American heritage. The purpose of education was to eliminate cultural diversity rather than to increase it. Nearly all professional and technical education has the same goal in mind--to teach one the common technology in order to enable him to function in a world of standard procedures. Standard procedures are necessary for efficient functioning within any technical area, but when standardizing techniques spread across education, they are a threat to the personalization of education and to identity within any sub-cultural group which shares different values, norms, and heritage from that of the main stream.

There is no doubt that much of the current world-wide hostility toward America stems from the fear of homogenization through the impact of media technology. It was in America that the industrial age first gave way to the technetronic age, increasing our capacity for imperialism through technology. The American expectation that, in the long run, an international American-style culture should be established provided the value base which all foreign groups find so threatening to their existence, and with good reason.

The obsolescence of the old forms of education can be seen in terms of purpose, substance, and form. The purpose was to homogenize society and to provide upward mobility through an industrial system. The substance was the substance of a primitive media world, one in which communication was largely through reading and writing, and through oral communication within the village. The form was mediation largely by textbooks and through multipurpose functionaries called teachers.

Proposition Five. The primary setting of education, the classroom, and the chief mediator of instruction, the multipurpose teacher, are obsolete.

First, the "classroom" as the primary "sub-institution" of learning is obsolete. When the school as we know it was created, the primary way of helping someone to learn was to get him together with an older and more knowledgeable person. The things to be taught were largely the familiar symbolic skills of the Western tribal civilization and it was not difficult to find some older people who would try to teach them to the young. The evolutionary forms of the school that followed were simply variants on the early classroom organization--the assumptions remained that an older, more tutored person would be brought together with a group of students. Two primary forms of staff-utilization developed.

One of these is called the "self-contained classroom" and centers around one or more teachers assigned to a group for whom they are responsible for most subjects. The other divides the responsibility by subject, with students shuttling from teacher to teacher.

These arrangements made relatively good sense so long as education was conceived in terms of relatively simple subject matter to be transmitted by relatively simple models of teaching to students who were conceived of as a rather undifferentiated mass. However, it is hard to conceive of arrangements more foreign to the contemporary media environment or more hostile to most of the possible models of learning or technological supports to learning. Individualization is extremely difficult in both the self-contained classroom (too many subjects to teach too many children) and the departmental instructional period (not enough time). Personalization is virtually impossible. The competency limitations of teachers are compounded by the impossible responsibility and the pressure for mastery of simple content.

It is small wonder that media specialists were content for many years to try to bring a greater diversity of media into this situation. Research into teaching has disclosed a remarkably flat national style of teaching centered around exposition and drill (over two-thirds of communications in the classroom are by teachers, over two-thirds of the questions asked are by teachers, and over nine-tenths of those are requests for specific answers)[17] which cries out for improvement. Media technologists and other reformers have made the understandable mistake of trying to improve the situation without changing the classroom style of organization. <u>This style has successfully repelled nearly every form of innovation.</u>

Let us look at these propositions together.

First, we are now linked by a vast variety of media which have the capacity to inform us continuously on many levels. This society is changing very rapidly and requires constant re-education and readjustment. The industrial-age educational system is woefully inadequate and we have the terrifying possibility that if our powerful new media are applied to the old forms of education a Huxleyian tragedy may result.

Concepts for Forward-Thinking

Radical reform is needed. Our task is to generate concepts for building a vastly different array of educational centers.

Concept One. Reform needs to be guided by emergent humanistic purposes.

Education is always a moral enterprise because it involves intervention in the lives of human beings. In the case of broad educational design, one plans for tens of thousands, even tens of millions, of people and the moral concerns which guide the directions of education have to draw education toward conceptions of human purpose powerful enough to capture and focus the needs of society.

The following statement reflects one man's view of humanistic purpose.

The Goals of the New Education

1. A primary goal has to be to comprehend and master the dynamics of the new technetronic world. We simply cannot permit people, if we have it in

our power to avoid it, to be unaware of the nature of the technetronic world and unable to participate in its recreation. An education has to be designed which can permit people to comprehend media and media forms, to understand the structure of society at the four levels which are important to the creation of the self and to the understanding of the global village.

2. We have to seize control of education and shape it to provide students with control over their destiny rather than the opposite, which was the case before. The new multimedia systems provide us with much greater power than we have ever had to build an education in which students learn models of learning which help them to acquire more education and to use the technological devices for their own self-development rather than to be controlled or caught in them. We can contrast sharply the concept of linear educational systems designed to turn out students as products and dynamic responsive educational systems designed to give them control to use these throughout their lives.

3. Citizens need to seize control of the tasks of reconstructing society at each of the four levels. A powerful education has to be built to help people recreate interpersonal relations, recreate communities, recreate the nature of their nations, and recreate the global village and the shape of the cooperative spaceship Earth.[18]

The Focus of Reform

The task of reform is the creation of learning environments which permit greater fulfillment of individuals, a fuller actualization of the possibilities

of community, and an involvement of citizens in the process of revitalizing and humanizing the society. This task is the core of the moral mission of education, the mission which reaches beyond the place of education as a reaction to the other dimensions of societal life to the imperative need for an education which has a positive role in the improvement of human social life.

The school of the past has been on an "industrial village" model, with teacher-taskmasters herding students through blocks of elementary material. Outside this school, the technetronic age emerged, led by technicians produced by the old education, which assumed that sheer scientific progress could improve the world without need for a rejuvenation of moral purpose and constraint.[19]

Now an education has to be devised in which students create their education in a contemporary environment of learning centers and in which they join the struggle to recreate governance at all levels of human society. The concepts we can use to design this education are partly the result of technical advances and partly derived from theories of institutional organization.

The enabling technical concept is that of multimedia support system.

The invention of multimedia instructional and support systems has provided the tools for creating learning centers in which a very large number of models of learning can be actualized over a great range of substance with considerable variation in complexity. By employing our media-technology we can offer to the student a very great number of ways to learn a large number of things. In addition, we can give him much control over his learning so that he can develop himself in a quantity of possible directions unthinkable even twenty years ago.

The comparison of the capability of multimedia systems with the range of the classroom is striking in the types of learning which can be controlled by the student as well as the ones which can be created for him. The

achievements of industry and military trainees are perhaps the most clear because of the investment which has enabled elaborate development to take place, but these are by no means the only examples. To make the point, however, let us consider the creation of the flight simulator.[20]

This device is striking because it provides the opportunity to learn exceedingly complex skills which are related to sets of diverse and precise theoretical knowledge bases. It uses a variety of media which are brought together with a series of learning tasks which can be paced by an instructor or by the student, with the aid of tracking systems which provide feedback about learning to either the external training agent or the student acting-as-agent.

On a much simpler scale, Joyce and his collaborators have developed a learning center based on a set of data banks storing information about a variety of communities representing a diversity of human societies. This learning center can be used in relation either to models of learning which respond to learner direction or which provide structured learning tasks and systematic instruction.[21]

The development of multimedia systems has made the distinctions among various media (motion pictures, television, print, etc.) less striking than the possibilities in the design of complex systems in which an array of media are used in appropriate combinations to support the effort of the learner.

The development of multimedia educational systems completely transforms the number of modes of education which can possibly be implemented, permitting us to stretch our imaginations in ways which are totally impossible as long as we think of the classroom and the teacher as the primary mediator

of instruction.[22]

On Organization

To replace the concept of the classroom, we have developed the concept of multi-modal or multiple-systems approaches to educational design. Rather than designing classrooms, we can design learning centers which employ different models of learning supported by various multimedia systems. These centers can serve various educational missions and be arranged so that the education for any given student or group of students can be created by relating him to appropriate combinations of learning centers.

The obsolescence of the classroom requires new design capability. The capability of multimedia systems combines with the multi-modal concept to provide the base on which we can create a new educational technology aimed not at improving the classroom but rather at the creation of a flexible array of centers for learning.

Education need not take place in specific, multipurpose institutions called schools directly linked to economic advancement, but can rather be organized in terms of learning centers to which people have a lifelong relationship. These learning centers can be directly related to the needs and purposes of a contemporary education.

Varieties of modes of education can be maintained in these learning centers, each mode appropriate to the particular kind of education that is needed by people.

By providing a variety of learning modes we present to the students an array of ways that they can develop themselves and give them the human support and facilitation to help them reflect on their goals and

and establish productive modes of learning.

Second, we create a variety of ways for students to reach one another and explore the possibilities of their common communication.

Third, such an environment, a contemporary media ecology within the provinces of schooling, makes it necessary for the student to learn to live in such an environment. To capitalize fully on this necessity, we would have to develop the opportunity for students to explore the nature of communication and media.

Media are employed in two types of systems in the various modes--as information support and as instructional sub-systems. Depending on how they are arrayed, these two supports can vary both the options which are available to the student and the amount of control which is provided. To examine the possible arrangements, we need to consider the media options which can be brought together.

The Array of Media Support Possibilities

In the design of informational support and instructional support systems, we can distinguish a variety of dimensions which affect the type of support which is made available.

First of all are the media types, a partial list of which follows :

Motion picture
Television
Still flat photographs
Graphic representations
Microfiche
Transparencies
Audiotape
Phonograph records

Clearly these media vary greatly in verisimilitude and other factors which affect the message in a vast number of ways which we will not attempt to explore in this paper except that criteria of optimality have to be developed to guide us in the creation of information storage and instructional supports.

Second is the function of media types in storage and instructional systems. A partial list of functions follows:

Task presentation - any media can be used to present learning tasks and a vast variety of learning models can be employed to generate them.

Feedback message - the communication system is as important as the media which are employed.

Substantive information source - again, any media can be employed to store information units, but the message is affected by the media.

Three styles of arrangement of media can be identified:

Random Access

This concept represents pure storage, with tasks, feedback messages, and information units being stored in categories from which they can be withdrawn in any order.

Linear

This concept represents a sequential ordering of media types in terms of various functions. A programmed sequence orders tasks, feedback messages, and information sources according to a plan to induce sequential learning.

Dynamic Interactive

This concept represents the arrangement of media functions within a communication system which provides tasks, feedback, and substantive

information in a pattern which permits instruction to be regulated according to learner performance and motivation. The pilot simulator is an example of a dynamic system, as is a language laboratory system.

Combining these media, functions, and styles of arrangement, we find the following potential combinations with any media types or combinations possible.

		Function		
		Task Presentation	Feedback	Substantive Information
Styles	Random			
	Linear			
	Dynamic			

The Array of Media Possibilities

When we consider the media types and the functions to which they can be put, we obtain an array of media possibilities rather than an analytic set of concepts which distinguishes media from one another. In one way or another, each of the media can be used in accordance with the possibilities of the matrix.

Each of the media can be used for each of the functions in one way or another. Motion pictures, for example, while they generally are used for linear information transmission, can be used for random access information transmission expecially when a series of motion pictures on a particular topic are stored under a category system to which the student has random access. Motion pictures can be used to present tasks as they are in pilot simulators, and the tasks can either be within a closed system or

a task can be selected by the learner. Similarly, feedback can be provided by motion pictures as it is in the driver simulator where a learner who turns the wheel to the right or left sees an image which provides him with the information he needs for corrective action. Similarly, in the teacher simulation developed by Kersh and his associates at the University of Oregon, motion pictures are used for reinforcement. When a teacher behaves in a certain way, he receives the reinforcing film, and when he behaves in a different way, he receives the punishing film. All of the media can be employed in all of these ways. This does not deny in any way the capabilities of the media. The purpose of this matrix is to present alternatives rather than, as indicated earlier, to analyze likenesses and similarities among media.

In the early days of literature on audio-visual instruction, much was made of the different capabilities of various media. The relevance of most of these distinctions has been greatly reduced by the invention of the concept of multimedia system. This is not to say that the concepts of media differences were not extremely useful, but they are intended largely for a time when the teacher was seen as the primary mediator of instruction, and it was important to teach teachers that they might use graphics and motion pictures as well as the chalkboard and their own mouths and textbooks as the primary media of teaching. Thus many of the concepts which distinguished, for example, the characteristics of an overhead projector and 35 millimeter slide from the concept of motion picture and the concept of chalkboard were invented in order to make these differences clear to teachers in order to encourage them to use a wider variety of media and the appropriate media for any given purpose.

Now that we can imagine organizing schools and other educational opportunities so that personnel are employed in many many roles, we need no longer use a language designed to exhort teachers to use more media, but we are now able to work with a concept of multimedia systems in which a variety of media are combined to perform various functions with respect to any educational purpose.

Suppose, for example, that we wish to design a system to teach mathematics to children. We can combine the various media to provide both random and sequenced access to information, to provide both designed and emergent activity initiation, and to provide informational and value reference feedback. For any given aspect of activity several media may function simultaneously or be very closely integrated to one another. We need not design so that all of instruction in any given area is carried out by any one medium.

The greatest change this is going to have or at least probably the most obvious and easy to perceive is that there will be such a small proportion in the future of instruction which is primarily agent mediated and in which the other media play very small roles. In the future we can expect much greater proportions of the instructional load carried by media and various combinations and our question is simply which learning models to use and in what combinations and which media to use in what combinations to support those learning models. Schools even today primarily use the agent medium and whatever model of learning he serves or is best suited to. The schools of tomorrow will find agents very much in the picture, but education in no area will be limited simply to what that agent can or will do at any given point of time.

Providing the Student with Greater Control Over His Own Learning

One of the great humanistic issues of our time is how we can use our technologies and especially our media to provide students with increasing control over their own behavior.

This is less a problem of how individual teachers should teach (which has been the traditional way of approaching the problem) but more the question, "How can we design the entire education milieu so that the learner obtains increasing control over his behavior?"

The fundamental proposal we shall make is to provide the learner with a variety of models of learning that he can exercise for his own purposes. The really helpless learner is not simply one who is controlled from outside but one who is unable to control his behavior because his own personal repertory is so limited. If a student has possession of a variety of strong learning models, then he is in a position to construct his own education. If he does not have these, eventually one way or another he will come under the control of others or will simply fail to learn because he does not have the necessary wherewithal to put together a meaningful education for himself.

Models of learning exist in terms of four families.[23] The family of "personalists" includes those theoreticians and practitioners who focus primarily on the individual's construction of his own reality. Thus they focus on the development of the individual, and speculate on the environments which might effect his personality or his general ways of relating to the world. Therapists, especially, tend to share a concern with the distinctive ways each person constructs his world; they see human nature

in terms of individual person.[24]

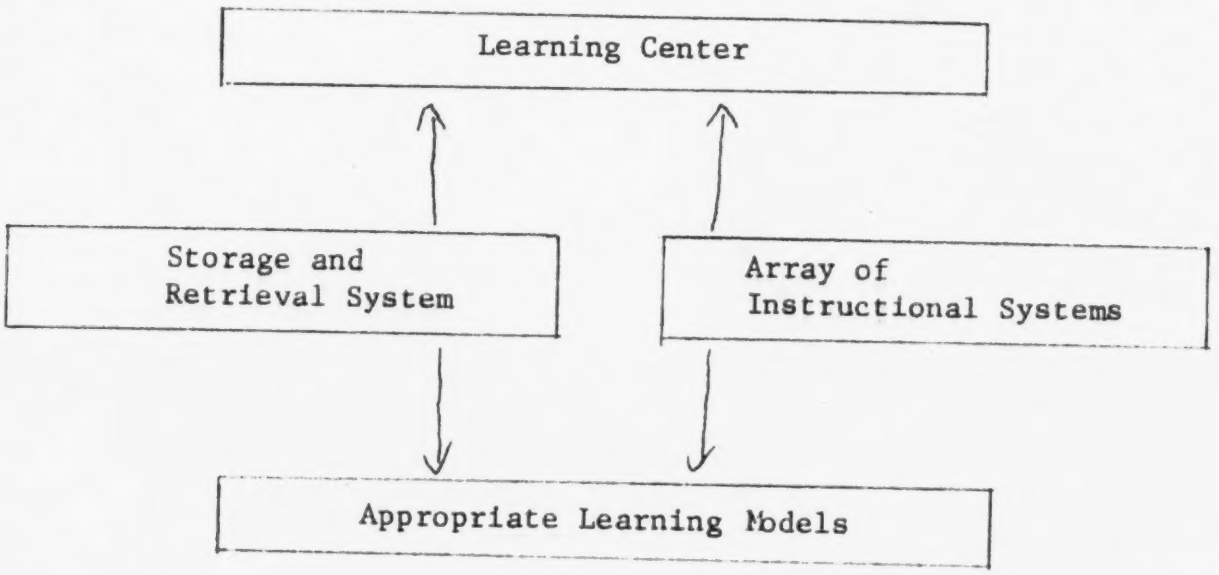
The second family, those educational theorists and practitioners who focus on the processes by which groups and societies negotiate rules and construct social reality, sees education as a process of improving the society. Many of them have suggested an ideal model for society and procedures for creating an education which can help to bring that model into a wider audience.[25]

Others who emphasize social behavior concentrate on interpersonal relations and the dynamics of improving them. The approaches to education in either case have a distinctly social character.

The information-processing category consists of educational theoreticians and practitioners who are concerned with affecting the information processing system of the student. So it includes those who have developed educational procedures designed to increase general thinking capacity (as the capacity to think abstractly or to think inductively). It also includes those who have focued on ways of teaching students to process information about specific aspects of life. For example, many educational theorists believe that a major mission of education is to develop approaches to the teaching of the academic disciplines, so that the student learns to process information in the ways that the academic scholar processes it and there achieves the intellectual power of scholarship.[26]

The fourth group focuses on the processes by which human behavior is externally shaped and reinforced. The major theorist in this area is B. F. Skinner, and their major efforts have been devoted to understanding the shaping of human behavior and how education can be built on an understanding of processes.[27]

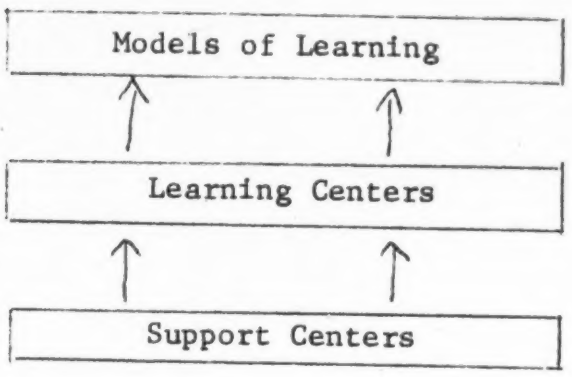
Within each learning center, the appropriate model of learning can be supported by various media technologies. Thus:



The result is an array of learning centers, each offering its distinctive learning models to support certain kinds of personal development. Hence:

Figure Six

Learning Centers, Models of Learning, and Support Centers



Media systems would support the various centers with each system of informational and instructional devices supporting a variety of learning centers.

Although research is barely begun in this area, it seems more than likely that the nature of media will gradually give rise to models of learning which can form the basis of learning centers for media competence.

The Institution is the Message

Such an institution would teach as much by its form as by its substance. Students, managing their learning, taking on learning models, working with a complex of communication systems, will adapt to life in an advanced technetronic society. Through the communal mode, they will practice the arts of governance.

Because they would actually create their education from a vast array of proffered components, they would learn that most needed of habits--that of controlling technology to recreate the forms of society.

FOOTNOTES

[1] Norman Mailer, A Fire on the Moon (Boston: Little Brown, 1971) pp. 47-48.

[2] The best-known present school which is organized around a series of learning centers is the Parkway School, a public secondary institution in Philadelphia, Pennsylvania.

[3] The facilitative model of learning is represented in the work of Carl Rogers, See, for example: Freedom to Learn (Columbus, Ohio: Charles Merrill, 1969).

[4] See: Bruce Joyce. Men, Media, and Machines (Washington: National Education Association, 1968) for a description of the relation of support centers to facilitative teams.

[5] For a prototype, see: Bruce and Elizabeth Joyce. Data Banks for Children (New York: Teachers College, 1969) a report to the U.S. Office of Education.

[6] See Harold Guitzkow, et. al. Simulation in International Relations (Englewood Cliffs: Prentice-Hall, 1963).

[7] Leland P. Buhford, Jack R. Gibb, and Kenneth D. Benns, eds. T-Group Theory and Laboratory Method (New York: Wiley, 1964).

[8] Teachers College, Columbia University, The Agnes Russell School experiments with learning centers and support systems of this type.

[9] Bruce R. Joyce and Marsha Weil. Models of Teaching (New York: Prentice-Hall, 1972)

[10] Zbigniew Brzezinski. Between Two Ages (N.Y.: Viking, 1970).

[11] Marshall McLuhan. Understanding Media (New York: Signet, 1964), p. 24.

[12] William M. Ivins. Prints and Visual Communication (Cambridge: Harvard, 1953), p. 179.

[13] ibid.

[14] McLuhan, op. cit, p. 41.

[15] Paul Saettler. A History of Instructional Technology (New York: McGraw-Hill, 1968).

[16] Zbigniew Brzezinski, op. cit.

[17] Ned Flanders. Analyzing Classroom Behavior (Boston: Addison-Wesley, 1970).

[18] Carl Weinberg, et. al. Humanistic Foundations of Education (New York: Prentice-Hall, 1972).

[19] Robert Boguslaw. The New Utopians (New York: Prentice-Hall, 1965).

[20] James F. Parker, Jr. and Judith E. Downs. Selection of Training Media (Wash., D.C.: Office of Technical Services, U.S. Dept. of Commerce, 1961).

[21] Joyce and Joyce, op. cit.

[22] Bruce Joyce. Alternative Models of Elementary Education (Boston: Ginn-Blaisdell, 1969).

[23] Bruce R. Joyce and Marsha Weil, eds. Perspectives for Reform in Teacher Education (Englewood Cliffs: Prentice-Hall, 1972).

[24] Joyce and Weil, op. cit for references.

[25] ibid, Part One.

[26] ibid, Part Two.

[27] ibid, Part Three.

[28] ibid, Part Four.